

# **DRAFT FINAL SAMPLING AND ANALYSIS PLAN**

**FOR THE**



**SAMPLING  
AT THE**

**GRANVILLE SOLVENTS SUPERFUND SITE  
GRANVILLE, OHIO**

**Prepared for  
Granville Solvents Site Response Management Group, LLC**

**June 2001  
Revised: July 2001**

**PREPARED BY:**

**SAMPLING AND ANALYSIS PLAN**  
**For The**  
**Sampling**  
**At The**  
**Granville Solvents Superfund Site**  
**Granville, Ohio**  
**July 2001**

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**For The**  
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**Granville Solvents Superfund Site**  
**Granville, Ohio**  
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## **1.0 INTRODUCTION**

Sharp and Associates, Inc., (SHARP) will conduct sampling to support the construction, startup, shakedown, and operation of the system to treat the impacted soils as part of the Granville Solvents Site Removal Action. The sampling scope was detailed in SHARP's proposal prepared in response to the Granville Solvents Site Response Management Group (Site Group) Request for Proposal (RFP) dated May 25, 2001. This Sampling and Analysis Plan (SAP), is for the subsurface soils and vapors from soil gas and does not address the ground water sampling also being conducted at the Site. The proposed sampling includes:

- Soil sampling underneath the concrete slab.
- Soil sampling during well installation.
- Soil Vapor Extraction (SVE) system effluent gas sampling.
- One analysis of demolition wastes for disposal parameters.

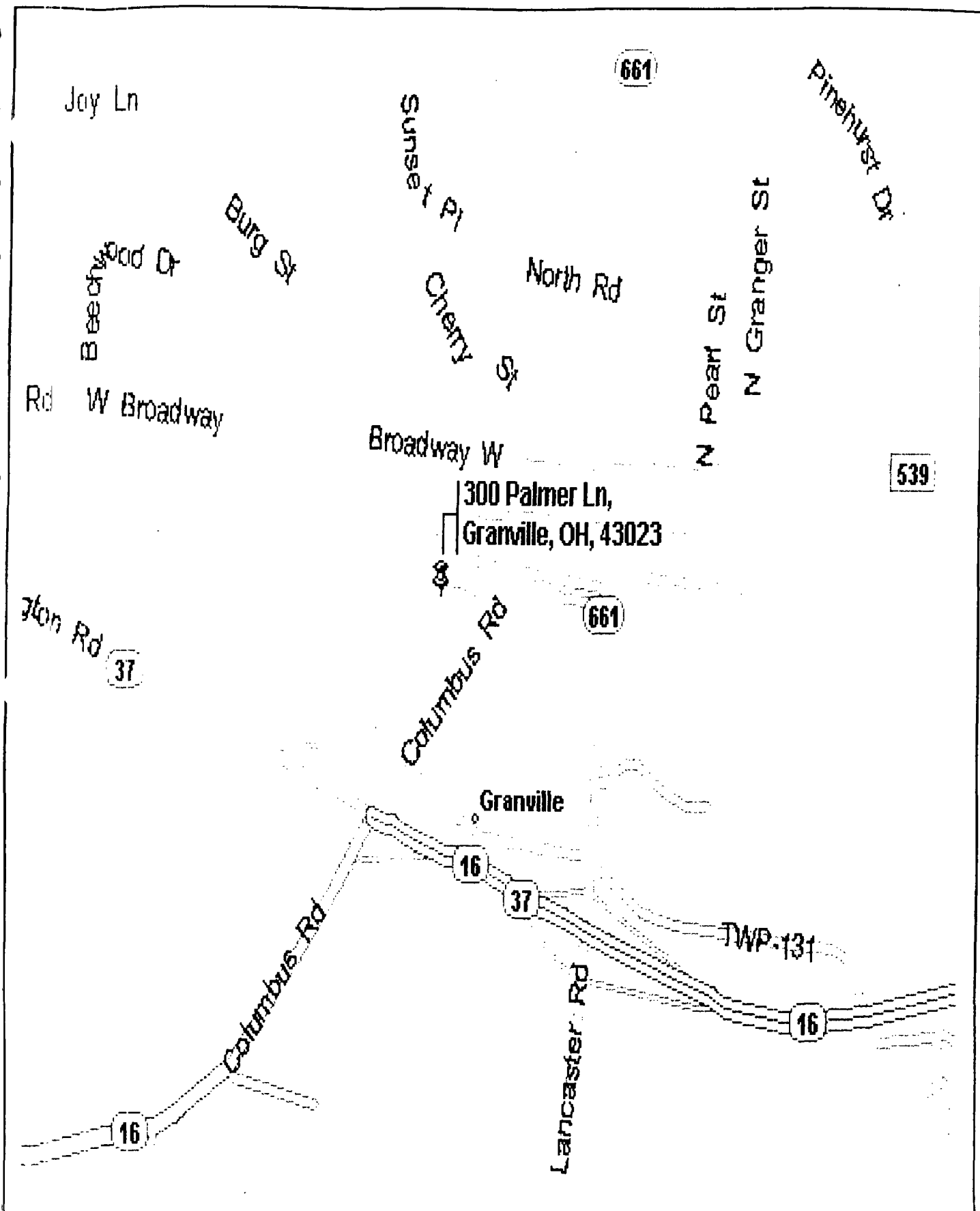
Confirmatory soil sampling to confirm remediation goals has not been included in the scope of this project; however, should sampling of soils be required to confirm remediation, these samples will be collected and analyzed in accordance with this plan.

The principal constituents of concern in the soils that require remediation are trichloroethene (TCE) and tetrachloroethene (perchloroethylene or PCE). The objective of this SAP is to describe the methods and procedures used to collect supplemental soil data to determine the initial mass of contaminants in the vadose zone. Additionally, the SAP describes procedures for gas sampling required as part of the ongoing operation of the remediation system once installed.

### **1.1 SITE BACKGROUND AND DESCRIPTION**

The Granville Solvents Site (Site) is located in Granville, Ohio (see Figure 1).

The Site Group is implementing soil treatment actions, ground water monitoring, and operation of a ground water treatment system in accordance with an Administrative Order on Consent (AOC) (1994) between the United States Environmental Protection Agency (USEPA) and the Site Group. The AOC requires completion of certain removal actions at the Site. The actions included the installation of a ground water pump and treat system to halt migration of ground water contamination toward the Village of Granville municipal well field, reinstatement of the capacity of the Village of Granville production well PW-1, and treatment of soils to levels that prevent further ground water contamination above the ground water "No Further Action" levels. To date, the Site Group has installed and is operating a ground water pump and treat system and has provided a new production well for the Village of Granville. The Site Group contracted with SHARP to implement the treatment of impacted soils. This SAP provides procedures to conduct the sampling in support of the treatment of impacted soils.



# Granville Solvents Site Location Map

FIGURE

1

PROJECT NUMBER	DATE	FILE NAME	SCALE

Data have been collected during previous investigations to characterize the nature and extent of contamination in soils and ground water at the Site. The results of these investigations indicate that chlorinated and non-chlorinated volatile organic compounds (VOCs) and semi-volatile organic compounds (SVOCs) are present at the Site. Compounds in the soil are primarily detected in the vicinity of the warehouse building.

An Engineering Evaluation/Cost Analysis (EECA) was conducted to determine the soil treatment requirements of the AOC. The EECA established risk-based soil treatment goals for the VOCs detected at the Site. The existing Site data shows two compounds, TCE and PCE, have been detected above their soil treatment goals of 6.67 mg/Kg and 5.53 mg/Kg, respectively.

## 2.0 SAMPLING PROGRAM

This SAP describes the procedures and methods for sample collection and analysis of all environmental media at the Site to support the performance of the work required to meet the AOC. *To the extent practical, SHARP will use information collected during previous investigations at the Site to minimize the necessity for additional sampling.* The SAP describes the rationale for sampling to fill any identified data gaps. The SAP describes:

- The types of samples planned to be collected.
- The number of samples planned to be collected.
- Anticipated sampling locations.
- Target compounds to be analyzed for.
- The methods of analysis.

This information is presented in Table 1 and Table 2.

### 2.1 SOIL SAMPLING PROGRAM

The following points from the EECA were used in development of the sampling and analysis program:

- All shallow soils (2'-4') had concentrations of constituents that were well below site cleanup goals.
- The maximum concentrations of constituents in the clay unit were found at 6'-8' depth – somewhat above the clay/sand contact.
- The maximum concentrations in the sand unit were found at 18'-20' depth -- just above the water table.
- Samples in previously analyzed areas need to be analyzed for TCE and PCE only.
- Samples from beneath the concrete need to be analyzed for VOCs only – requiring minimal volume.
- The presumed source of the solvent contamination is located beneath the building. Given the building floor construction and the Site soil types, the constituents likely migrate along preferential pathways through the clay to reach the sand unit. These pathways may be visible in whole or part once the building floor is removed. These soils underlying the building floor will be visually evaluated to identify preferential pathways – paying special attention to the areas in the vicinity of the building floor drain.

- Because all of the newly constructed auger holes will be located in the area to be remediated, augers do not require decontamination between holes.
- Two-inch split spoons are sufficient to collect the needed sample volume; split spoons require decontamination between samples. Split spoons are advanced ahead of augers so that the non-decontaminated augers will not confound the sampling of the borehole soils.

The EE/CA reported soil sample results taken from the Site; however, as only one soil boring was advanced through the soils underlying the building, additional VOCs will be included with the soils taken from this area. The data presented in the EE/CA are sufficient and self-consistent enough to limit the need for additional investigation in other areas at the site. The following sampling and analysis program is based on the EE/CA and the soils data presented therein.

- One sample per shallow air injection boring to confirm TCE and PCE concentrations in clay and confirm TCE and PCE mass concentrations. Samples will be taken from the clay portion of the split spoon collected to identify the clay/sand contact.
  - Samples collected from outside the building footprint will be analyzed for chlorinated hydrocarbons per Method 8021.
  - Samples collected from within the building footprint will be analyzed for VOCs according to Method 8260. These data will be used to confirm the concentrations of TCE and PCE as well as ensure that no other constituents are present at levels that exceed the soil cleanup goals defined in the RFP.
- Two biased shallow soil samples taken to characterize the most-apparently-contaminated areas beneath the building.
- One sample in the sand unit at just above the water table for each of six soil vapor extraction (SVE) wells.
- One sample from each air sparging well in the sand unit at just above the water table.
  - Every soil sample will be field-screened with a photoionization detector (PID) to support correlation of field-PID readings with analytical results.
  - No soil samples to be taken from below the water table.

### ***2.1.1 Confirmation Sampling***

Should soil sampling be required to confirm completion of the remediation, these soil samples will be collected using a similar approach to that described in the this SAP. However, to maintain the integrity of the remediation infrastructure, SHARP proposes to confirm remediation of site soils using vapor concentrations and a soil-to-groundwater leaching model. In anticipation of using this approach at the Granville Solvents Site, the soil samples and analytical methods required to use this approach have been included in the SAP (e.g., collection of Shelby tube samples for porosity and percent organic carbon analyses).

## **2.2 SYSTEM EXHAUST SAMPLING PROGRAM**

The SVE effluent will be sampled (monthly during the first quarter of operation, quarterly thereafter) to monitor system removal efficiencies and to ensure that air emissions are controlled to less than 10 lbs/day. SHARP will perform calculations to correlate PID readings with the TO-14 analyses and tabulate the number of pounds of TCE and PCE removed by the system.

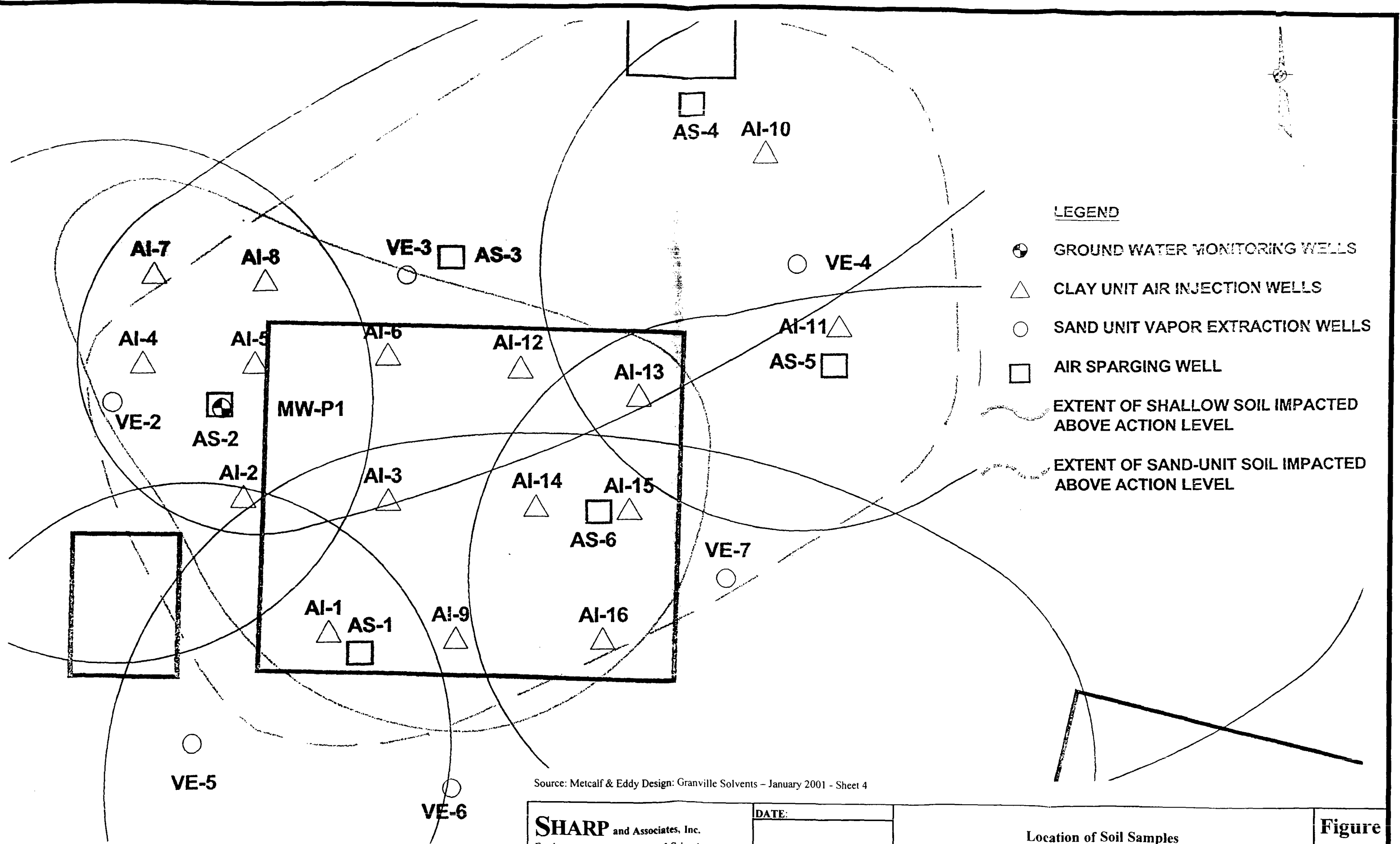
Whenever a PID reading of the system effluent is collected, a sample will also be collected to monitor and record concentrations in the breathing zone at the 4 compass point locations on the Site boundary. PID readings will be correlated to the TO-14 results, to the extent practical.

Table 1 provides a summary of the planned sampling and analysis program.

**Table 1. Summary of Planned Sampling  
Granville Solvents Site**

# Samples	Sample Source	Analysis
5	Air Injection borings outside bldg footprint (borings AI-2, 4, 5, 7 and, 8)	Halogenated Hydrocarbons (8021)
9	Air Injection borings within bldg footprint (Borings AI-1, 3, 6, 9, 12, 13, 14, 15, 16)	TCL VOCs (8260)
6	VE borings (all outside bldg footprint) (VE-2, 3, 4, 5, 6, 7)	Halogenated Hydrocarbons (8021)
4	Air sparge borings outside bldg footprint (AS-2, 3, 4 and, 5)	Halogenated Hydrocarbons (8021)
2	Air sparge borings within bldg footprint (AS-1 and AS-6)	GC/MS VOCs (8260)
2	Biased surface soil samples within footprint	GC/MS VOCs (8260)
Total = 28	Boring samples	15 - 8021 + 13 - 8260
1	Building material waste characterization	TCLP VOCs/SVOCs/Metals w/extraction
4	System air emissions	TO-14
2 sets	Clay/sand matrix (collected in Shelby Tubes)	Archive; hold for porosity, % carbon, other analyses to support model development.

All contaminated soils and cuttings from the soils borings will be placed within the SVE footprint.



**LEGEND**

- GROUND WATER MONITORING WELLS
- △ CLAY UNIT AIR INJECTION WELLS
- SAND UNIT VAPOR EXTRACTION WELLS
- AIR SPARGING WELL
- EXTENT OF SHALLOW SOIL IMPACTED ABOVE ACTION LEVEL
- EXTENT OF SAND-UNIT SOIL IMPACTED ABOVE ACTION LEVEL

Source: Metcalf & Eddy Design: Granville Solvents - January 2001 - Sheet 4

**SHARP** and Associates, Inc.  
 Environmental Engineers and Scientists  
 982 Crupper Ave. • Columbus, OH 43229

DATE:
PROJECT: [NUMBER]

Location of Soil Samples

**Figure**  
**2**



## **2.3 SOIL BORING SAMPLING PROCEDURES**

Soil borings will be advanced using 4¼ inch hollow stem augers (HSA). If significant contamination is encountered, the augers will be decontaminated using a high-pressure steam cleaner between boring locations. Observations of drilling conditions and soil cutting characteristics including color, grain-size, moisture content and PID screening results will be recorded in a field book.

Soil samples will be collected at the locations described in Table 1 using a decontaminated 2-inch diameter split spoon. Samples will be identified by the boring location followed by the depth interval. Upon reaching the top of the selected sample interval the center plug will be removed from the HSA's and replaced with the split spoon. Split spoon samples will be collected in two-foot intervals by continuously dropping a 140 pound hammer from a height of thirty inches. The number of hammer drops per six inches will be recorded in the field book.

The split spoon sample will be removed from the boring and a representative portion will immediately be placed in the laboratory-supplied container. The remaining soil will be placed in a resealable plastic bag for headspace screening using a PID.

### ***2.3.1 Split Spoon Decontamination Procedures***

Effective decontamination of sampling equipment is required to prevent the cross-contamination of Site samples. The planned decontamination procedures are outlined below.

All split spoons will be decontaminated prior to being used. Initially, the decontamination will serve to remove any dust and/or dirt accumulated during transit to the Site or possible residual contamination from previous use. Thereafter, the decontamination procedures will remove any residual contamination from the preceding sampling activities.

All split spoons will be disassembled to the extent practicable prior to decontamination. Since only organics are potential constituents of concern, the decontamination procedures will consist of the following:

1. Wash split spoons with potable water and non-phosphate based detergent.
2. Rinse split spoons with potable water.
3. Rinse split spoons with a 40% methanol solution.
4. Rinse split spoons with "high purity" deionized water.

The equipment will then be allowed to air dry and may be wrapped in plastic until needed.

## **3.0 ANALYTICAL PROGRAM**

PACE Analytical Services (PACE), located in Indianapolis, Indiana will supply all bottles, coolers, and preservatives needed for the soil sampling event. Severn-Trent Laboratories will supply the SUMMA canisters for collection of the VOCs in air samples. All analyses conducted by PACE and Severn-Trent will be performed in accordance with the current USEPA SW-846 and EPA-approved methods.

Samples will be shipped on a daily basis (or as needed) via FedEx (or equivalent). Field personnel will be responsible for arranging a schedule for pick-up.

Laboratory address and contact information are as follows:

**Soil Samples:**

PACE Analytical Services, Inc.  
7726 Moller Road  
Indianapolis, IN 46268

Project Contact: Travis Garrett  
Phone: (317) 875-5894

**TO-14 Summa Canisters:**

Severn-Trent Laboratories  
5815 Middlebrook Pike  
Knoxville, TN 37921

Project Contact: Jamie McKinney  
Phone: (865)588-6401

## **4.0 FIELD-RELATED QUALITY ASSURANCE REQUIREMENTS**

### **4.1 QUALITY ASSURANCE SAMPLE TYPES**

During sampling, a number of quality control (QC) samples will be collected and submitted for laboratory analysis. The number and frequency of QC sample collection is determined by the individual project requirements and is outlined in this section.

A list of the types of QC samples that will be collected along with a brief description of each sample type is outlined in the following sections.

#### ***4.1.1 Trip Blank***

Trip blanks will be collected for chemical analysis of volatile organics. The analytical results serve as a baseline measurement of volatile organic contamination that samples may be exposed to during transport and laboratory storage prior to analysis.

Trip blanks are comprised of analyte-free reagent water for organic analyses. The water is placed in 40 mL sample containers at a location away from the Site's influence and transported to the sample collection Site, stored along with the samples, and shipped to the laboratory along with samples of water collected for volatile organic analysis. The trip blank containers will not to be opened in the field.

**One trip blank will be included with coolers shipped to the Site containing samples for volatile organics.**

The trip blanks will later be stored in the laboratory with the sample containers and analyzed for VOCs only.

#### ***4.1.2 Duplicate Sample***

A duplicate sample will be collected from one location and submitted as a "blind duplicate" (i.e., sample designation that does not indicate that the sample is a duplicate sample). This sample will be submitted with the other soil samples collected from the site and analyzed for the same parameters as the original sample collected from that location.

The duplicate sample should be collected after the original sample has been collected. The duplicate sample will be analyzed for the same parameters as the associated sample. *Only one duplicate sample will be collected.*

#### **4.1.3 Laboratory Quality Control Samples**

Laboratory quality control samples indicate laboratory-specific problems and provide indices relating to matrix recovery. Method blanks determine the existence and magnitude of contamination problems. Matrix and laboratory spikes provide information about matrix recovery limits. Duplicate analyses (for matrix and blank spikes) are indicators of the precision of the sample results. One method blank, one duplicate analysis, and one set of MS/MSD samples will be run for every Sample Delivery Group (SDG). An SDG shall contain a maximum of 20 samples. Laboratory control samples (blank water spiked with the analytes of interest) shall also be run every 20 samples.

### **4.2 SAMPLE PRESERVATION, HOLDING TIMES, AND QUANTITIES**

Table 2 lists the type of containers required by the laboratory and the maximum holding time allotted for each analysis. The field crew or Site manager will make arrangements to procure required sample preservatives and decontaminated sample containers, including those necessary for field quality assurance samples.

### **4.3 SAMPLE CUSTODY AND IDENTIFICATION**

#### **4.3.1 Chain of Custody**

An overriding consideration essential to the validation of environmental measurement data is the necessity to demonstrate that samples have been obtained from the locations stated and that they have reached the laboratory without alteration. Evidence of the sample traceability from collection to shipment, laboratory receipt, and laboratory custody (until proper sample disposal) must be documented. A sample is considered to be in a person's custody if the sample is:

- In a person's actual possession;
- In view after being in a person's possession;
- Locked so that no one can tamper with it; and,
- In a secured area, restricted to authorized personnel.

The field technician is responsible for overseeing and supervising the implementation of proper sample custody procedures in the field. He/She is also designated as the field sample custodian and is responsible for ensuring sample custody until the samples have been properly transferred to a courier and sent directly to the laboratory.

**Table 2 - Sampling Requirements for Soil Samples  
Collected at the Granville Solvents Site, Granville, Ohio**

Parameter	Analytical Method	Bottle Requirement	Preservative	Sample Hold Time
TCL Volatiles	SW-846 Method 8260	3 x 40 ml VOA vials	HCL Ice to 4°C	14 days from Lab receipt
Chlorinated Volatiles	SW-846 Method 8021	3 x 40 ml VOA vials	HCL Ice to 4°C	14 days from Lab receipt
Volatiles in Air	EPA Method TO-14	6 L SUMMA canister	None	14 days from lab receipt

Once the samples have been received by the laboratory, samples proceed through an orderly processing sequence specifically designed to ensure continuous integrity of both the sample and its documentation.

The following chain of custody procedures are implemented by field personnel by:

- Preparing and attaching a unique sample label to each sample collected;
- Completing the chain of custody form; and
- Preparing and packing the samples for shipment.

These procedures are further described in the following sections.

#### **4.3.2 Sample Labels and Tags**

Field personnel are responsible for uniquely identifying, labeling, and tagging all samples collected during a field investigation. All labeling and tagging must be done in indelible/waterproof ink. Any errors are to be crossed out with a single line, dated, and initialed. Each sample label securely affixed to the appropriate sample container and sample tag attached to the neck of each sample container must contain the following information:

- Client/Site name;
- Unique project-specific sample identification number (i.e., station number);
- Sample location/description number;
- Type of analysis to be performed and the name of the laboratory to whom the samples are being sent;
- Sample volume, container type, and the type of chemical preservation used;
- Sampling date and time; and
- Initials of the person obtaining the sample.

#### **4.3.3 Chain-of-Custody Form**

A chain-of-custody form must be completed for each set of samples collected at a sampling location. The form is maintained as a record of sample collection, transfer, shipment, and receipt by the laboratory. The forms must also contain pertinent information concerning sampling locations, dates, and times; signatures of the sampling team members; types of samples collected, along with a unique sample identification number:

the number of samples collected and shipped for analysis in each lot; the project name and number; and the name of the laboratory to which the samples are being sent.

#### **4.3.4 *Transfer of Custody***

Samples shall be accompanied by an approved and completed chain-of-custody form during each step of custody, transfer, and shipment. When physical possession of samples is transferred, both the individual relinquishing the samples and the individual receiving them shall sign, date, and record the time on the chain-of-custody form. In the case of sample shipment by an overnight courier, a properly prepared airbill shall serve as an extension of the chain of custody form while the samples are in transit.

#### **4.3.5 *Sample Packaging and Pick-Up***

Following sample collection, all samples shall be brought to an on-site location for batching and paperwork checks. Labels and log information shall be checked to ensure there is no error in sample identification. The samples are packaged to prevent breakage and/or leakage during transport to the laboratory. Any pertinent information regarding particular sample hazards (i.e., any dangers anticipated upon opening of the sample bottle) is included on the chain-of-custody form.

Unless field-collected information indicates otherwise, all environmental samples collected shall be treated as non-hazardous materials. Because of the expected non-hazardous nature of the collected samples, packaging and shipping criteria have been designed only to maintain chain of custody protocol as well as to prevent breakage of the sample containers. The packaging and shipping procedures shall be as follows (or equivalent):

- Place a layer of bubble wrap in the bottom of the watertight insulated metal (or equivalent plastic) shipping containers.
- Wrap the properly labeled and secured glass sample bottles and purgeable vials with plastic bubble wrap. Place the wrapped containers into watertight zip-lock-type bags and seal the bags closed.
- Place sample bottles (top side up) into the shipping container – arranging the bottles so that plastic bottles surround the glass bottles, if possible.
- Using the necessary packing material, pack the sample bottles to ensure that they do not shift during transport.
- Fill any void spaces of the shipping container, around and on top of the sample bottles, with ice cubes or chips.
- Seal the appropriate chain of custody form(s) in a zip-lock-type plastic bag and tape it securely to the inside of the shipping container lid.
- Close and latch the shipping container. Seal the space between the container body and lid with waterproof tape. (If the shipping container used is a picnic cooler, tape the drain plug closed to prevent any leakage of water as the ice packs melt during transport.)
- Apply several wraps of custody tape around the shipping containers perpendicular to the seal to ensure that the lid remains closed if the latch is accidentally released or damaged during shipment. Do not obscure any stickers or labels on the shipping container with the custody tape.

## 5.0 FIELD INSTRUMENT CALIBRATION PROCEDURES

Preventative maintenance of field equipment is required to ensure the collection of valid field measurements. All necessary maintenance procedures will be performed and documented in the project-specific field log book and on the daily equipment calibration/check forms.

Before any test equipment can be used in the field, proper calibration also must be ensured. Specific calibration procedures for various instruments are described in detail in the following sections.

### 5.1 PHOTOIONIZATION DETECTOR

A PID will be used in the field for the following activities:

- As a screening aid during drilling to identify the presence of volatile constituents. The PID will be used to monitor the air in the area of drilling operations and the soil cuttings periodically as the holes are being drilled. The use of the PID in this capacity is for site health and safety monitoring.
- As a screening aid during split spoon sampling to identify the presence of volatile constituents and to support sample selection. Soil samples are screened to determine the soil intervals with the highest PID readings for laboratory analysis. Where only one split spoon sample is collected per boring, the sample is contained in a plastic bag and field screened by puncturing a hole in the bag and reading the PID display screen. These field-collected data will be correlated with the laboratory analytical data.

The PID that will be used in this Site investigation is a Thermo Environmental Instruments Model 580B Organic Vapor Meter equipped with a 10.2 eV lamp (or equivalent). The ionization potential for Trichloroethylene and Tetrachloroethylene is 9.45 eV and 9.32 eV according to the *NIOSH Pocket Guide to Chemical Hazards*. A 10.2 eV lamp will provide reliable detection for Trichloroethylene and Tetrachloroethylene.

When calibrating the PID, the gas standards used for calibration shall be at ambient temperature and pressure and delivered to the instrument at the proper flow rate.

Calibrations using toxic or hazardous gases will be performed outdoors or in a hood. The frequency of calibration will be dictated by the frequency of instrument use and the toxicity of the species measured. At a minimum, the PID will be calibrated at the beginning of every field sampling day. After the analyzer has been serviced or repaired, it will be calibrated to verify proper operation and performance.

An accurate and reliable method of checking the calibration is to use a certified gas mixture supplied in a gas cylinder in the test setup described below. Additional instruction on calibration technique is provided in the PID/Data Logger Model 508B Operations Manual.

#### 5.1.1 Calibration of the PID by the Analyzed Gas Cylinder Method

The analyzed gas cylinder is a compressed gas cylinder containing the species of interest (or similar constituents) at known concentrations in an air matrix at or near the concentrations expected in the field. The calibration gas must be stable within the cylinder during the period of use. If the calibration is required

in the field, a small cylinder shall be used. The cylinder material shall be compatible with the calibration gas. The cylinder shall be equipped with a regulator, which fits properly and also shall be compatible with the calibration gas. The operator shall contact the supplier in the event of uncertainties. Extreme care shall be taken in the handling of gas cylinders: the contents are under high pressure and, in some cases, the contents may be hazardous.

One method of sampling the calibration gas is to connect the PID to a flow regulator and the probe. The flow regulator does not require a valve (if there is a valve, it must be left wide open). All connections as well as the main cylinder valve shall be leak-tested to prevent toxic or hazardous materials from leaking into the work area. The flow from the regulator is pre-adjusted such that only a small amount of excess flow is registered. This adjustment insures that the calibration gas flowing to the PID is at atmospheric pressure and is close to the ambient temperature.

A gas calibration cylinder shall not be used below a pressure of 200 psi, because loss of pressure could cause the concentration to vary. The cylinder shall not be used past the recommended shelf-life of its contents.

#### **5.1.1.1 The Probe**

The PID probe shall be set up properly prior to the overall instrument calibration. The required steps to follow in this procedure are outlined below:

1. Identify the probe by the lamp label. The energy of the lamp is etched into the glass envelope.
2. Connect the probe to the readout assembly, making sure the red interlock switch is depressed by the ring on the connector.
3. Set the SPAN potentiometer to the proper value for the probe being calibrated (refer to the calibration memo accompanying the probe).
4. Check the Ionization Potential (IP) of the calibration gas to be used to verify that the IP of the calibration gas is at or below the IP of the lamp.
5. Proceed with the calibration as described below.

#### **5.1.1.2 Calibration Method**

The PID shall be prepared for use each day according to the following procedures:

1. WARM-UP: 5-10 minutes.
2. BATTERY CHECK: Turn the function switch to the battery check position. The needle should reach within or above the green area on the scale plate. If the needle is in the lower portion of the battery arc, the instrument must be recharged prior to making any measurements. If the red LED comes on, the battery must be recharged.
3. CHECK UV LIGHT SOURCE: Turn the function switch to the "on" position. In this position, the UV light source should be on. Check this by looking quickly into the end of the probe to see the purple glow of the lamp.
4. ZERO INSTRUMENT: Turn the function switch to the standby position and rotate the zero potentiometer until the meter reads zero. (Clockwise rotation of the zero potentiometer produces an upscale deflection while counterclockwise rotation yields a downscale deflection).
5. RANGE: With a 2-point calibration, the instrument is first calibrated with the higher concentration standard using the span potentiometer, then the instrument is calibrated at the lower concentration using

the zero potentiometer. These steps should be repeated several times to ensure that a good calibration is obtained.

6. RECHARGING INSTRUMENT: The PID shall be recharged overnight after each day's use. To charge the battery, place the mini phone plug into the jack on the left side of the bezel and plug the charger into a 120 VAC source. (NOTE: When disconnecting the charger, remove it from the 120 VAC source before removing the mini phone plug). The battery should completely recharge in 14 hours. To ensure that the charger is functioning properly, turn the function switch to the battery check position, place the phone plug into the jack, and plug the charger into an AC outlet. The needle reading should go upscale if the charger is working properly and is correctly inserted into the jack.

#### **5.1.1.3 Calibration Check**

A short-cut method may be used to quickly check the calibration of the PID in the field. Immediately after a calibration has been completed, a reading can be taken on an isobutylene standard. The reading obtained is then used as a benchmark throughout the day. Reading of the isobutylene standard may be taken and adjustments to the PID may be made as required. This is an indirect method of calibration, one that maintains the calibration on the isobutylene standard to indicate the fidelity of the calibration to the original gas mixture.



**Attachment 1:  
Sample Chain of Custody Form**



Environmental

AND ASSOCIATES, INC.

## Engineers and Scientists

## CHAIN OF CUSTODY RECORD

Send results to:

SHARP &amp; ASSOCIATES, INC.

982 CRUPPER AVENUE

COLUMBUS, OHIO 43229

(614) 841-4650 Fax: (614) 841-4660

CUSTODY SEAL NO.

[illegible]